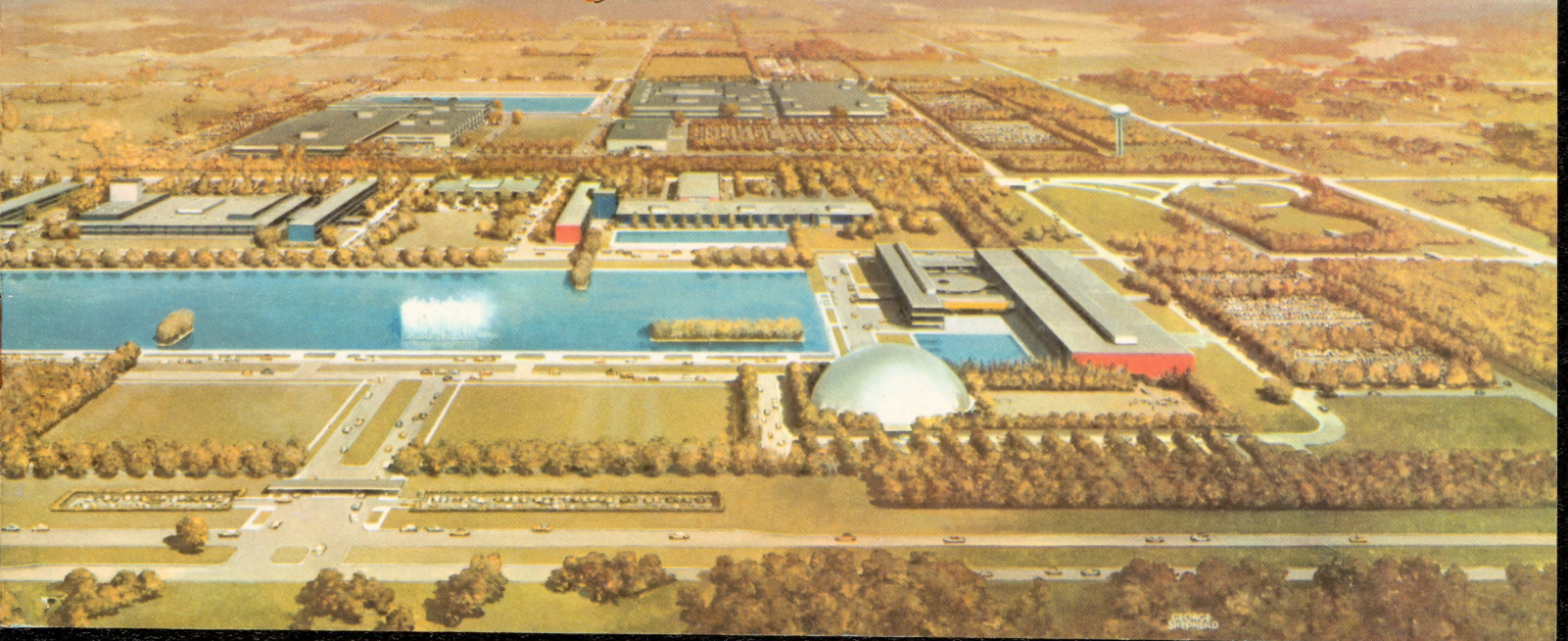
Where Today Meets Tomorrow

GENERAL MOTORS TECHNICAL CENTER



Where Today Meets Tomorrow

GENERAL MOTORS TECHNICAL CENTER

PUBLIC RELATIONS STAFF
GENERAL MOTORS
DETROIT

• Photographs by: Ezra Stoller
★ Photographs by: General Motors Photographic

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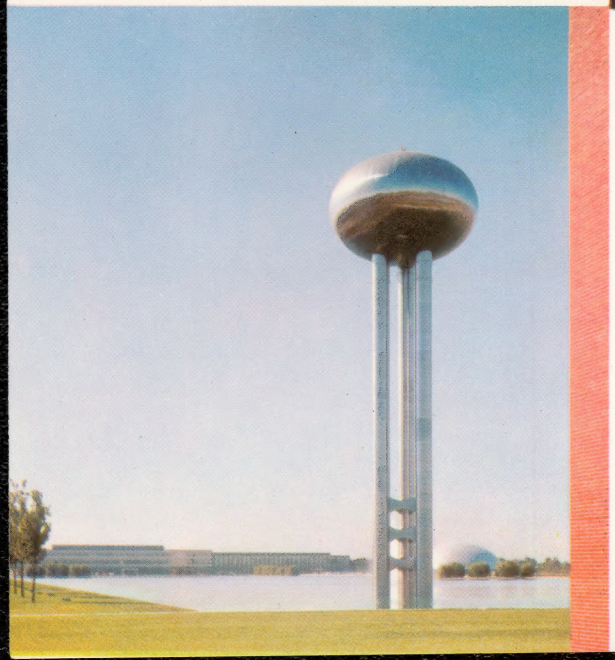
Challenge



More than half of the 20th century is behind us—nearly half ahead of us. From the past fifty years have come miracles—the automobile, the airplane, motion pictures, radio and television, and the splitting of the atom. But this is history, and all of us should be interested in the future because, as C. F. Kettering puts it, "there's where we are going to spend the rest of our lives."

Today the world is undergoing a technical upsurge unequaled in the history of man. You can see it all around us—atomic energy is being harnessed, jets sweep the sky at almost twice the speed of sound, and electronic computers perform years of calculations in a few minutes. Scientific man is on the move.

These things are a challenge to American industry—a challenge not only to keep pace but to forge ahead—a challenge to bring new scientific discoveries down to earth and to apply the principles to creating more and better things for everyone. We must and can dream bigger; we must and can accelerate our pace from year to year.

We in General Motors accept this challenge. Since our birth nearly fifty years ago, we have pioneered in creating the new and useful, in filling the needs and desires of millions of people. We intend to continue this policy in the next half century. We are meeting this technical challenge by applying the best talent, the best equipment, and the best facilities available to molding Tomorrow.

And most representative of this thinking is the new Technical Center.

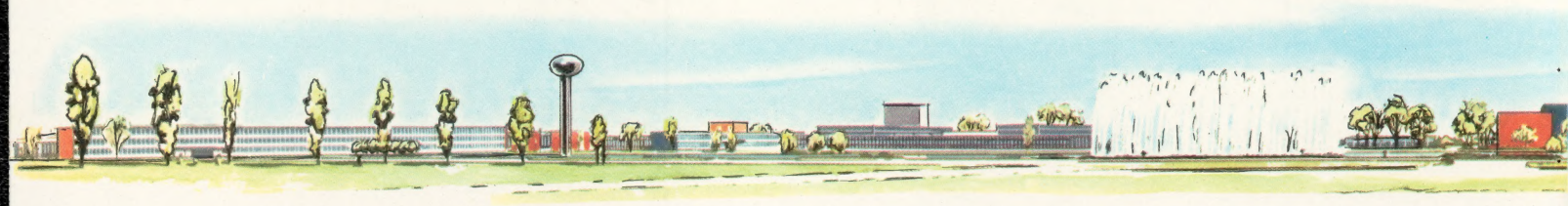
HARLOW H. CURTICE
PRESIDENT

Birth of an Idea

In the spring of 1942 the management of General Motors decided the time was appropriate to take a look at its research and development facilities and determine whether they measured up to the tremendous demands that would be made upon them in the future.

What they saw was not too encouraging. Research and Styling occupied cramped quarters in a congested mid-city community. The Engineering Product Study Groups also occupied restricted quarters. And they all were working with time-worn equipment and instrumentation that could not be replaced in the War years.

These were the facilities which General Motors would have to rely on to do fundamental research and development work in this new age of scientific progress. Of



course, each of its manufacturing divisions had its own engineering and development staff and facilities, but these were chiefly concerned with its own product in the immediate future. The far ahead pioneering would have to be done with the inadequate equipment and facilities of central Research, Styling, and Engineering.

So, to assure future progress and meet the challenge of the new technological age, the management decided to take a bold step—meet the future with the world's foremost aggregation of technical talent, equipment, and facilities.

Thus was born the idea of a Technical Center.

The Plan Comes to Life

To gain a better appreciation of the Technical Center as it now exists, we should keep in mind the purpose for which it was planned —to promote science, the mechanical arts, and styling.

The word "promote" carried the connotation of closely coordinated activities working in an atmosphere conducive to study and experimentation. It meant the best in physical equipment and facilities. It meant being within easy reach of General Motors manufacturing divisions and its Proving Grounds.

Keeping these things in mind, a site northeast of Detroit, and only 30 minutes from the General Motors Building, was purchased. Here are located five groups—the Research Staff, Styling, Engineering Staff, Manufacturing Development, and a Service Section.

The focal point of the twenty-five buildings housing these groups is the 22-acre lake. Facing the lake on the north are the Research Staff laboratories, shops and test rooms. At the opposite end of the lake, the Styling building faces north. On the east side are the Service Section, Manufacturing Development, and Engineering Staff buildings. Large parking areas, screened by trees and shrubbery, are located adjacent to each building group.

This arrangement lends an air of spaciousness and a campus-like quality so conducive to the type of original thinking and experimentation taking place within the walls of the various buildings.

The buildings themselves, planned by renowned architects, are functionally designed to contribute in every way possible

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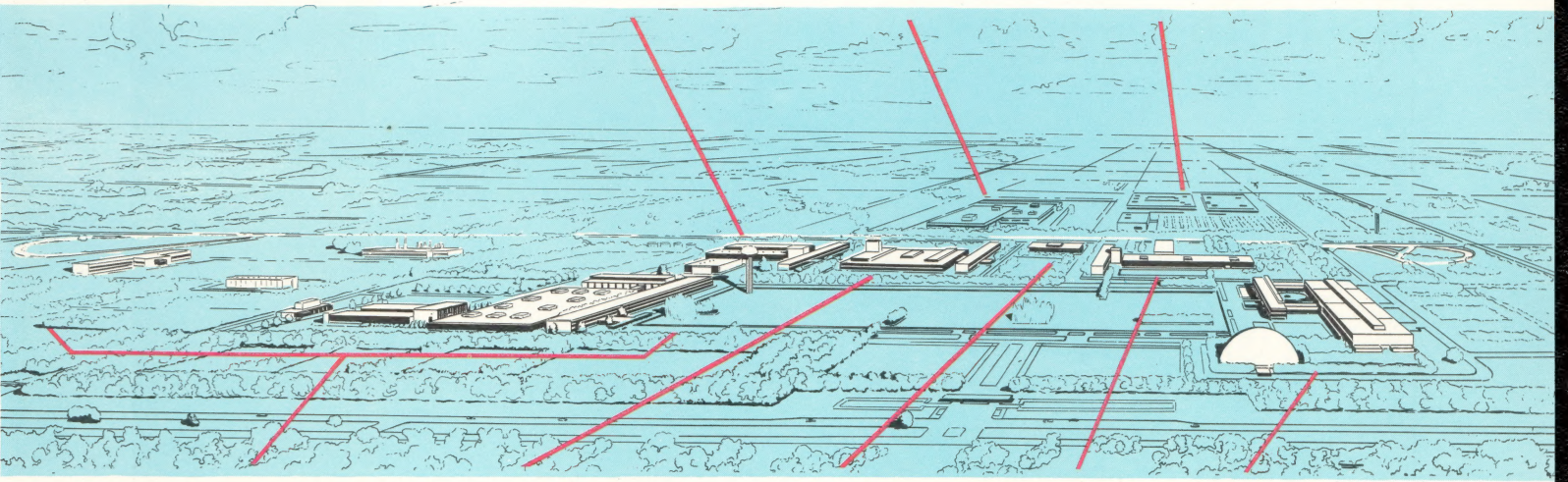
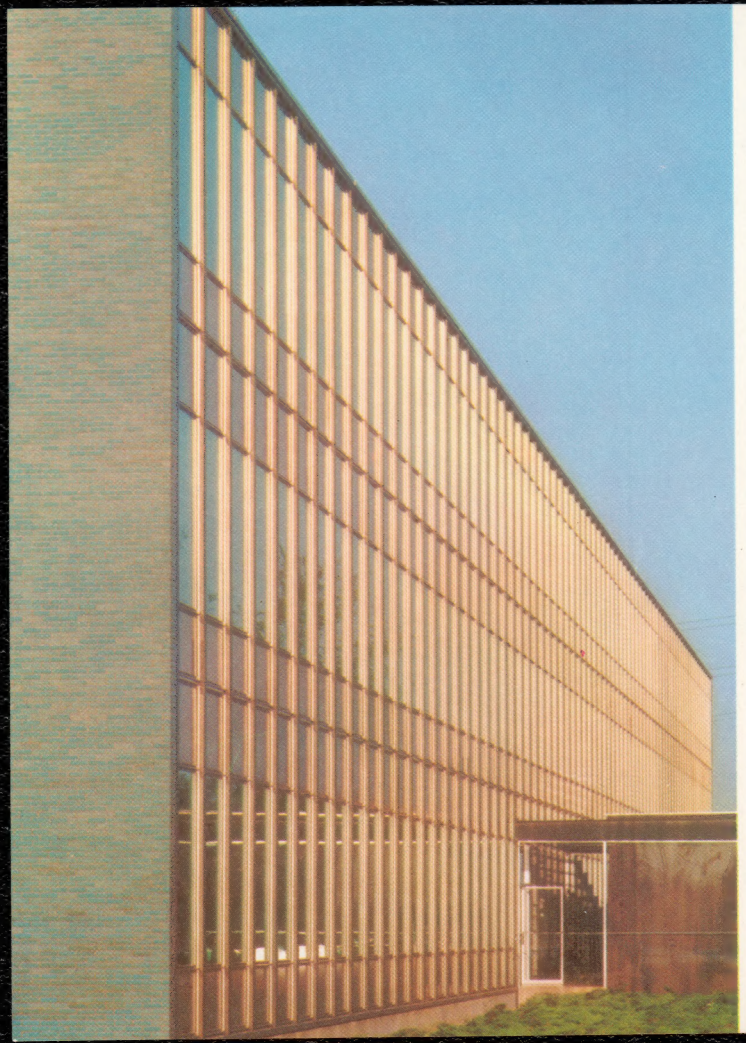
SERVICE SECTION · CHEVROLET ENGINEERING · FISHER BODY



RESEARCH · MANUFACTURING DEVELOPMENT · CENTRAL RESTAURANT · ENGINEERING · STYLING

to the creative type of investigations being carried on within. None higher than three stories, these buildings have the clean, functional lines of contemporary architecture, utilizing colorful, glazed masonry and walls and structural steel framing that emphasizes large glass areas for natural lighting. Inside, comfort is maintained by



Steel, glass and glazed-brick walls are dominant architectural features.

ceilings which combine high velocity air conditioning, fluorescent lighting, and sound proofing.

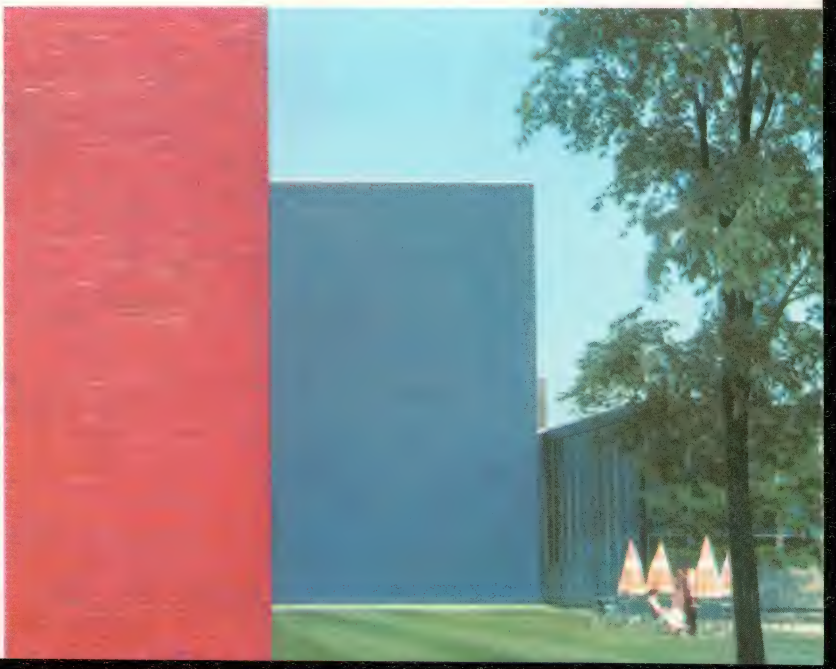
On the experimental side these buildings contain a collection of unique and diversified equipment unequaled in the world today. There is a 100-mile-per-hour wind tunnel, a radioactive tracer laboratory, electronic computers, a metallurgical building housing an experimental foundry, dozens of engine testing laboratories, eighty-foot design studios, and a huge room where a section of an experimental production line can be put into operation. And for meetings there are half a dozen auditoriums, seating anywhere from 50 to 1,000 people.

As a facility the Technical Center is new. But the personnel concentrated here represents several decades of accumulated

The Research Library is typical of the light and airy interiors.

knowledge, which has brought General Motors leadership in research, engineering development, and styling. Although most of the talent assembled here possesses a broad and often long experience with General Motors, at the same time continuously expanding research and development programs offer interesting opportunities to young scientists, engineers, and designers just starting their careers.

In this atmosphere, surrounded by the best available equipment, these men can give free rein to their intelligence and skills. Here no limits are placed on imagination or creativeness. Here teams of men working together as close neighbors can develop a new idea, all the way from a mark on a piece of paper to a production sample that can change our way of life Tomorrow.



Colorful glazed-brick walls provide a background for the Engineering patio.

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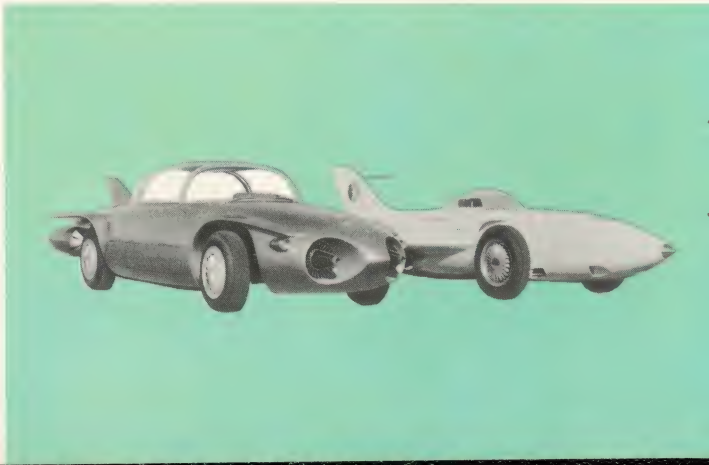
The Inside Story

To the visitor the relationships between the various Technical Center activities may not at first be apparent. And also how do these operations fit into the over-all General Motors engineering picture?

First, it should be understood that the Technical Center is only a location. Each staff activity—Research, Styling, Engineering, and Manufacturing Development—is an independent group, answering to its own chief executive, a vice president of General Motors. Thus these activities are decentralized in the same manner as our manufacturing operations.

The Technical Center is only one element in our organization working for progress. Each of our divisions has its own extensive engineering development and design organization. Men here at the Center and those at the divisions work closely together. This means that we can make up a team—or a number of teams—to bring the best available talent to bear on any problem. In this respect General Motors is unique in American industry.



The gas turbine-powered Firebirds I and II are examples of Styling and Research cooperative projects.

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Let us look at our over-all engineering relationships from another point of view. We must remember that the engineering departments of the GM divisions, such as Chevrolet, Pontiac, Oldsmobile, Buick, Cadillac, GMC Truck and Coach, Frigidaire, Allison, and Electro-Motive, are chiefly interested in the products they will make in the immediate future—in the next two or three years.

The Research Staff, however, is concerned with developments five, ten, or even fifteen years from now. In a broad sense, Research deals with new concepts of living as they may be realized a generation or so from now. Styling also projects its designs far into the future as witness, for example, the gas turbine powered, experimental cars —the Firebird I and Firebird II.

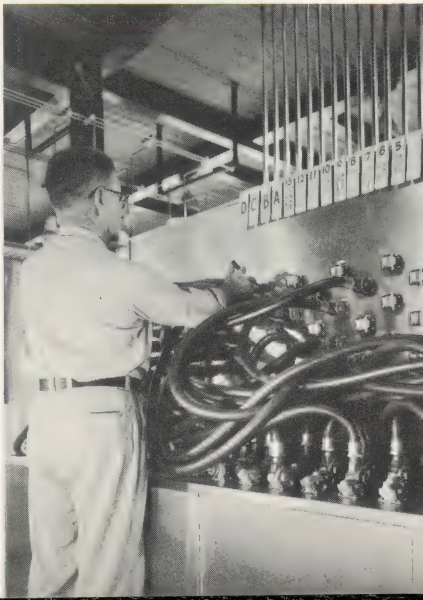
The Engineering Staff bridges the gap between fundamental research, the forward looking designs of Styling, and the divisional engineering departments. They take a new principle or concept and carry the development work a step or so further, all the time working closely with the Research or Styling people on the one hand and the divisional engineers, who may be the ultimate users, on the other.

The role played by the Engineering Staff in the development of the product has its counterpart in the Manufacturing Development Section, which performs the same bridging function but in the field of developing new manufacturing processes and techniques.

The Technical Center Service Section, as the name implies, operates and maintains the various Technical Center facilities and services.

In the following pages we shall discuss more fully each of these Technical Center activities.

The Research Fuel House shown above contains the unique fuel switchboard, right, which permits the operator to rapidly connect any one of seventeen fuel storage tanks to any test cell.



The electron microscope greatly extends the Research physicist's horizons.

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Research

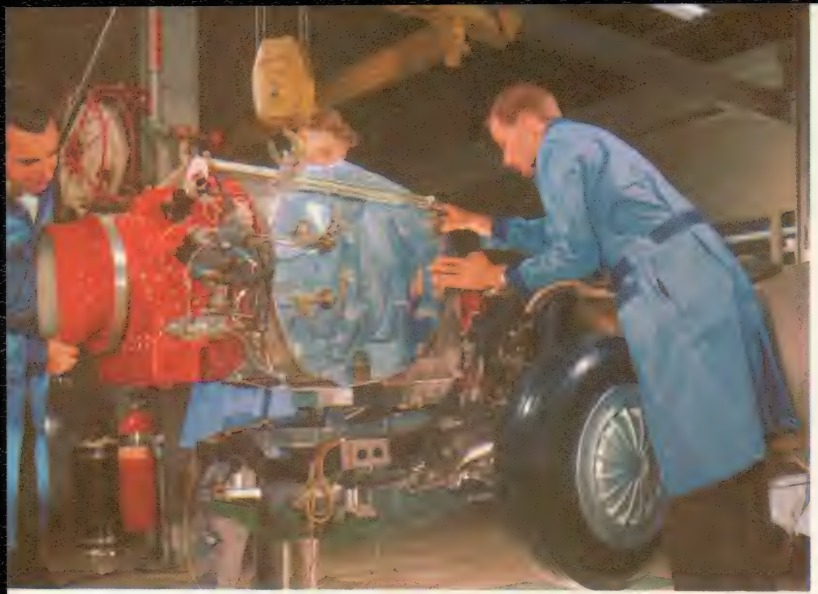
The focal point of the Research lobby is the suspended spiral stairway.

Located at the north end of the central lake is the largest group of Technical Center buildings—the home of the Research Staff.

Here in the main building are the basic science departments, where men who rank as authorities seek new fundamental information in the fields of physics and chemistry—new knowledge of the process of combustion; an insight of the mechanism of electroplating; a better understanding of the effect of crystalline structure on a material's properties.

In adjacent buildings Research engineers work to gain a better understanding of why metals seem to "grow tired" or fatigue; to learn more about the basic nature of friction; to test new engines and formulate theories as to why one design is better than another, and then apply these theories to new designs. In one of the most elaborate experimental foundries in the world, Research metallurgists scientifically juggle alloys to produce new materials with better wear properties, greater high temperature

South facade of Research Building.



Installing the Whirlfire GT304 gas turbine engine in the Firebird II.

Conditions duplicating a car traveling 100 miles per hour under a midsummer sun can be produced in the Research wind tunnel.

The advanced Experimental Foundry has played an important role in the outstanding contributions of Research metallurgists.

strength and improved resistance to corrosion.

Many of these studies may seem remote to your daily life, yet may exert a profound influence on your future.

For instance, the Chemistry Department is working on new automotive lacquers and thinners that could change the appearance and durability of the finish of the Car of Tomorrow.

The problem of harnessing the power of the gas turbine to the wheels of a car is one that is not solved overnight. It requires a deep knowledge of thermodynamics, painstaking design, new metallurgy, skilled craftsmanship and the most advanced testing facilities available.

And the gasoline engine in today's car is only an indication of the possibilities that lie ahead in this field. New high-compression designs coupled with new fuels, lubri-

High-speed photography and the quartz window engine have enabled Research engineers to unravel many of the mysteries of combustion.

This modern dynamometer installation built to specifications of Research engineers reflects years of experience in engine testing.

cants, materials and transmissions offer possibilities that spur on hundreds of Research engineers and technicians to greater efforts.

In one of the largest privately owned and operated laboratories of its kind, Research physicists are putting atoms to work by applying radioactive isotopes to making unbelievably precise measurements.

These same Research people have engaged in humanitarian projects seldom identified with automotive research. They have used their experience and skills to develop the first successful mechanical heart and to produce the Centri-Filmer, which spins vaccines into a film one-twentieth the thickness of a human hair as part of a purification process.

These are only an indication of the hundreds of projects that engage the minds and hands of almost 1,500 Research scientists, engineers and technicians. Their daily investigations are concerned not only with problems of the future but with those of today as well. For their specialized knowledge and facilities are made available to all of the other engineering groups in General Motors, so that this enormous reservoir of scientific talent and experience

can bring about further improvement of General Motors products.

Thus the Research Staff makes a twofold contribution to General Motors' technical leadership: one, by helping to improve the products of this year and next; the other, by uncovering new knowledge which may lead to things only dreamed of today.

Experience gained in 30 years' operation of automotive cold rooms has resulted in this modern version, where cars can be tested at 90 degrees below zero.

Radioactive isotopes are new tools in Research investigations.

Looking west across the main entrance of the Styling Administration Building toward the aluminum clad dome of the Styling Auditorium.

An outdoor "viewing terrace" is connected with the main studio building and the auditorium.

Styling

Opposite the Research Staff buildings, at the other end of the lake, stands the striking Styling building and its silver-domed auditorium. Here the future seems already to have arrived.

Just as the Researchers probe for hidden

Large 80 by 55 foot studios provide flexible working areas and controlled lighting.

A typical Interior Design Studio.

GMC Truck and Coach designs of tomorrow are born in this studio.

facts, nearly a thousand Stylists and technicians with their imaginations and skillful fingers try to capture the look of things to come.

Within this glass-walled building are located studios, engineering departments, drafting rooms and shops. There are individual studios for Chevrolet, Chevrolet Truck, Pontiac, Buick, Oldsmobile, Cadillac, GMC Truck and Coach, Electro-Motive, Euclid, and Frigidaire. And none of the designers in these studios has access to the other studios—in a way they compete.

In the studios the designs are developed first on paper, then in three-dimensional clay

models. In the fabrication shops prototype models are built, using plaster, Fiberglas, wood, and metal. There is an entire section devoted to the design of automobile interiors. Other activities include design of household appliances, trucks, buses, and railway locomotives. There are color experts, fabric experts, plaster and plastic craftsmen, wood and metal model makers, trimmers, painters, and the administration people, who have to tie together the whole thing.

An automobile body is a home on wheels —a home in which the average American family spends a great deal of time and covers a great many miles. And like the other home it must possess features that appeal to all members of the family—appearance, comfort and convenience. It is the job of the Stylists today to see that Tomorrow's home-on-wheels has all of these things in full measure, to see that the cars you will purchase in the years ahead will measure up to and even exceed your greatest expectations.

The Color Studio provides a limitless source of color combinations and interior trim materials. ★

Experimental bodies come to life in the Plaster and Plastic Shop.

Models depicting the varied activities of the Product and Exhibit Design Group are seen in this studio.

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Just as Research must maintain constant liaison with other development groups at the Technical Center and the engineering departments of the manufacturing divisions, so must Styling keep abreast of other GM developments and use the facilities of other departments to test and further develop its creations.

And since the divisions, which will produce the cars and appliances of Tomorrow, are the final arbiters, there is a

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constant two-way flow of information between the engineering and production people and Styling.

If we were only permitted two words to describe General Motors Styling, our choice would be "creative" and "practical." It was to achieve these two objectives that the unique Styling facilities were made part and parcel of a technical center dedicated to the future.

Products and experimental designs are viewed and evaluated in the huge Styling Auditorium.

Skilled fingers at work in the cutting and sewing room of the Trim Shop.

A brilliant end-wall faces the lake.

A view of patio and pool contributes to precision engineering.

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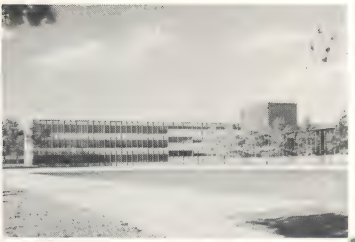
Engineering

On the east side of the lake, the Engineering Staff building houses a variety of activities—Engineering Development, Engineering Staff Services and Facilities, and Corporation Services and Facilities.

Of prime importance is the role of engineering development carried on by groups of highly trained engineers and specialists. One of these groups, Power



A reflecting pool nestles in an angle of the building.

Experimental springs are tested for durability on automatic cycling machine and under simulated road conditions.

Assembly of Allison jet engine combustion chambers in Parts Fabrication.

Development, is concerned with engine and engine accessory development. This same group carries on development work in the field of household appliances. Another group, Transmission Development, is concerned with the design and development of automatic transmissions. A third group, Structure and Suspension, is engaged in the development of new and improved suspension systems. A fourth is the Vehicle Development group, whose role is to design and develop over-all passenger cars as well as Ordnance and military vehicles, using new principles and new approaches.

From these engineering development groups will come new engineering concepts and new designs for improved safety, better performance, and lower cost in Tomorrow's automobile. Many of their projects are to assist the divisional engineering departments. Others are of long-range development of interest to the Corporation as a whole. Some projects are nearing commercial application. Others are years away with considerable expense, exploration, study, test, refinement, and engineering perfection still ahead before they will reach our customers in a product.

The Engineering Staff Services and Facilities Section supplies the operating materials and services required by the Development group—the test facilities and machine facilities are the two most actively used.

The Corporation Services and Facilities group contributes mainly to the development programs of the GM manufacturing divisions by supplying specialized services. One of the most important activities in this group, the Proving Ground Section, is not located at the Technical Center. The combined Proving Grounds, covering 6,154 acres located at Milford, Michigan; Mesa, Arizona; and Pikes Peak, Colorado, offer GM engineers every modern facility and service for the road testing of all cars as well as commercial and military vehicles.

It will be seen from this brief description of the Engineering Staff activities that this organization of nearly 2,500 people occupies a very important niche in the General Motors engineering program. It is an important link between Research experiments, Styling designs, and the products that will come off the assembly lines Tomorrow.

A camera on a trailing sulky records car roll on curves.

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High-velocity fluid flow measures efficiency of experimental torque converter blade design.

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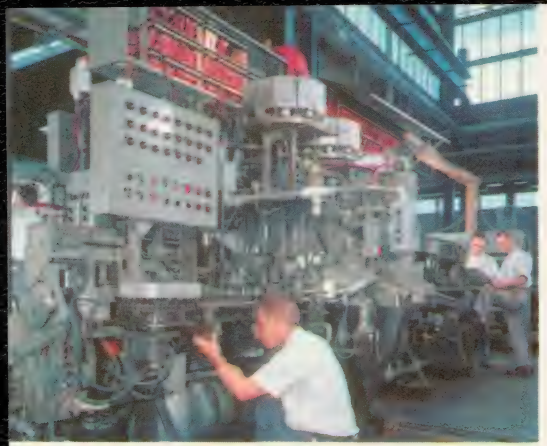


A typical semi-automatic assembly machine for water pump bearings during construction.

An automatic computing and recording efficiency test stand for steering gear assemblies.

Manufacturing Development from above.

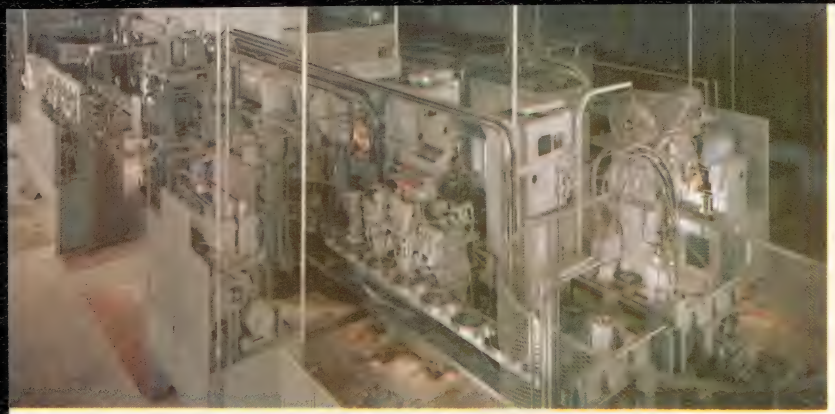
Manufacturing Development

On the east side of the Center, the Manufacturing Development buildings house a group of activities performing an engineering and research function for the General Motors manufacturing operations. Engineers and technicians in this activity develop ways of making things dreamed up by the fundamental researchers and engineers and thought highly desirable, but as yet impractical to manufacture by any known method.

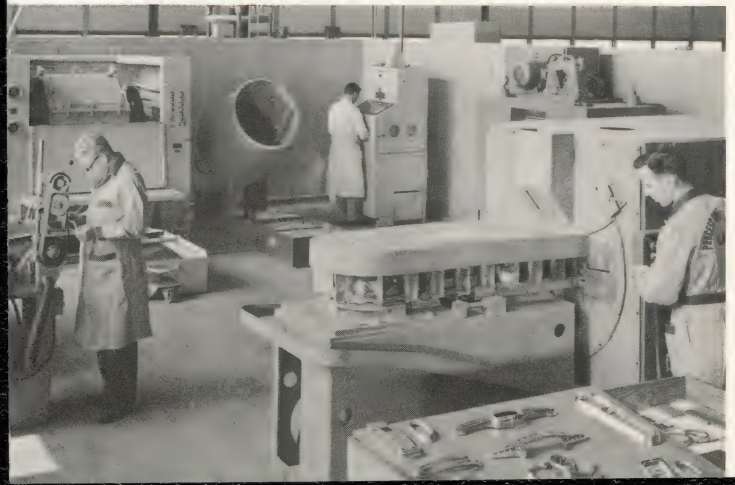
To accomplish this end requires such facilities as are found in most research laboratories and, in addition, the production tools used in manufacturing plants. Here are located chemical and physical laboratories, metallurgical and spectrographic, and electronic laboratories fitted with elaborate testing equipment and analog computers. There are shops for research in the cutting, welding, heat treatment, and finishing of

Manufacturing Development as seen from across the Mall.

Radiator cap assembly machine designed and built by Manufacturing Development in operation.



A 67 foot long semi-automatic machine for assembling the 51 parts in a Hydra-Matic transmission torus.



Various processes used to improve the surface finish of cast and machined parts can be evaluated in the Experimental Metal Finishing Shop.

metals. The experimental foundry and sand laboratory located here are among the finest of their kind in the world today. And, in addition, there is a large tool room and machine shop equipped with the finest of modern precision machine tools.

The people who supervise General Motors plants are constantly striving to improve plant layouts, tools, equipment, and methods to achieve three basic objectives. First, of course, is to improve the quality of the products; second, to improve the working conditions of General Motors employes; and third, to reduce the cost of the products.

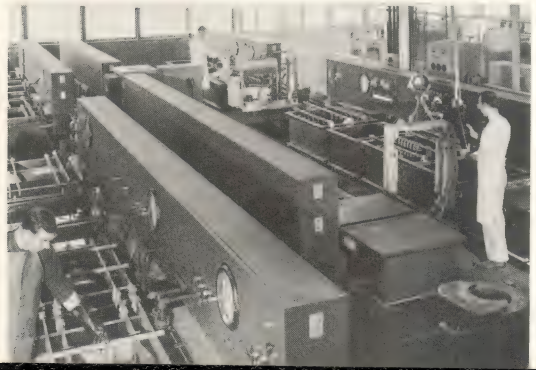
The General Motors manufacturing divisions are doing an outstanding job, so why such an operation as Manufacturing Development?

The organization has a group of engineers and technicians who spend their entire time in searching for new and better ways of making things, unhampered by current pro-

Molding sand storage bins in Experimental Foundry.

duction problems. There is also a group of Production Engineers, Standards and Methods Engineers constantly searching out the best ways of manufacturing in our own plants through committee representatives. This large reservoir of staff experience plus the knowledge that can be tapped in all the General Motors divisions provides an organization capable of solving the more difficult manufacturing problems. They conduct long-range development programs and explore untried methods and processes.

The result may be advice, a technical report, or service rendered to a manufacturing division. It may be a very special machine or a new manufacturing process which enables us to make in quantity something long thought desirable but impractical to produce. The end result can be the same in all cases—new and improved ways of making more and better things for more people, Today and Tomorrow.



The Plating Shop is designed to facilitate experimental plating; or a pilot process operation with practically any plating or chemical treatment solution can be set up here.

Carefully planned landscaping and a colorful wall distinguish the rear of the Service Section Building.

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In addition to being an excellent car display area, the Styling Auditorium can seat over 1,000 people.

Service Section Building and entrance canopy with unique support.

The main Power Plant produces 320,000 pounds of steam every hour.

Service Section

In order to permit the development groups at the Technical Center to concentrate entirely on research, design and engineering, a fifth group was established—the Technical Center Service Section, which operates and maintains the site facilities. Research, Styling, Manufacturing Development, and the Engineering Staff groups function as independent units and as tenants on the site maintained for them by the Service Section.

As landlord, the Service Section administers the Central Restaurant, which also

The principal feature of the Central Restaurant, on the left, is the metallic Bertoia screen shown in the two scenes above and to the right.

The Manufacturing Development Auditorium seating 242 is one of the most popular meeting places at the Technical Center.

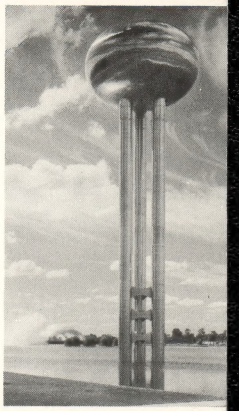
The colorful Styling Cafeteria overlooks the lake.

supplies food for the cafeterias located in the other buildings.

In the Service Section Administration Building is located the main Technical Center medical department with branches in the buildings of the other operations. Here also is one of the largest private communication boards in the world, designed to handle the telephone and teletype services for all of the Technical Center operations.

Under the supervision of the Service Section are also the fire equipment, plant protection facilities, and an ambulance service, all very necessary services to the safe and efficient functioning of an operation the size of the Technical Center.

And among its other responsibilities, the



The water tower clad in stainless steel dominates the landscape.

Service Section must see to the production and distribution of heat and power to all the units, an adequate water supply, the maintenance of eleven miles of road, and the care of 25,000 trees, plants, and shrubs of more than 200 varieties.

In other words, the Service Section must handle the same problems as those faced by a city of over 10,000 people plus others peculiar to the highly technical nature of the Technical Center operations. So, in planning to invade the future, the management of General Motors could not afford to overlook any factor, whether as small as a traffic sign or as large as a power plant producing 320,000 pounds of steam every hour.

The Research Auditorium seats 125 people.

Research, like Styling, has its own cafeteria.

New Horizons

We have attempted in this little booklet to show the results of a dream—a dream of some far-seeing men who visualized the challenge offered by the future and conceived a way to meet that challenge.

The General Motors Technical Center is that dream come to life. There is good reason to believe that nowhere in this country, or even the world, is there concentrated within an area of a square mile such a collection of technical knowledge, experience, skills, and facilities.

This Technopolis, if we may coin a word, is, however, just a supplement to other General Motors engineering activities located in other sections of our country. But the over-all combination of 20,000 technical people plus unmatched facilities, we believe, is unequaled in abilities to create, develop, and produce the conveniences and necessities of Tomorrow.

What will be the shape of that Tomorrow, we do not know, but if we use the past half-century as a guide, we know that Science and Engineering in the years to come will unveil the keys to an entirely new way of life. Things undreamed of today will become a part of our daily lives to make them richer, more convenient, healthier, and more enjoyable. With this in mind we in General Motors dedicate the Technical Center to Tomorrow.

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